

- 1 -

SEQUENCE LISTING

<110> Melbourne Health  
Southern Health  
Austin Health  
5 St. Vincent's Hospital (Melbourne) Ltd. trading as St. Vincent's  
Hospital Melbourne  
Bayside Health  
BARTHOLOMEUSZ, Angeline, Ingrid (US Only)  
10 LOCARNINI, Stephen, Alister (US Only)  
AYRES, Anna (US Only)  
YUEN, Lilly, Ka, Wai (US Only)  
SASADEUSZ, Joseph, John (US Only)

15 <120> Viral Variants; Detection and Application

<130> 12510140/EJH

20 <150> AU2003905776  
<151> 2003-10-21

<150> AU2004900962  
<151> 2004-02-25

25 <160> 42

<170> PatentIn version 3.1

30 <210> 1  
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<212> DNA  
<213> hepatitis B virus

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|    | tcagtccgtt tctcctggtt cagttacta gtgccatttgc ttca                  | gtgggtt cgtaggc | 780  |
| 5  | tcccccactg tttggcttcc agttatatgg atgatgtggt attggggcc aagtctgtac  |                 | 840  |
|    | aacatcttga atccctttat accgctatta ccaattttct tttgtctttg ggtatacatt |                 | 900  |
|    | taaacccctaa taaaaccaag cggtgggct actcccttaa ctcatggga tatgtattt   |                 | 960  |
| 10 | gaagttgggg taccttgcca caggaacata ttgtacaaaa aatcaaa               |                 | 1007 |
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|    | <210> 2   |                 |      |
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| 15 | <212> PRT   |                 |      |
|    | <213> hepatitis B virus   |                 |      |
|    | <br>  |                 |      |
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|    | 1 5 10 15   |                 |      |
|    | <br>  |                 |      |
| 25 | Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys   |                 |      |
|    | 20 25 30  |                 |      |
|    | <br>  |                 |      |
|    | Asn Pro His Asn Thr Lys Glu Ser Arg Leu Val Val Asp Phe Ser Gln   |                 |      |
|    | 35 40 45  |                 |      |
| 30 | <br>  |                 |      |
|    | Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro   |                 |      |
|    | 50 55 60  |                 |      |
|    | <br>  |                 |      |
| 35 | Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu   |                 |      |
|    | 65 70 75 80   |                 |      |
|    | <br>  |                 |      |
| 40 | Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala   |                 |      |
|    | 85 90 95  |                 |      |
|    | <br>  |                 |      |
| 45 | Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val   |                 |      |
|    | 100 105 110   |                 |      |
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|    | Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr   |                 |      |
|    | 115 120 125   |                 |      |
| 50 | <br>  |                 |      |
|    | Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu   |                 |      |
|    | 130 135 140   |                 |      |
|    | <br>  |                 |      |
| 55 | Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His   |                 |      |
|    | 145 150 155 160   |                 |      |

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Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175  
5

Pro Phe Leu Leu Val Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

10 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

15 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile  
210 215 220

20 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr  
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
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Trp Gly Thr Leu Pro Gln Glu His Ile Val Gln Lys Ile Lys  
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30 <210> 3  
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20 25 30

45 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys  
35 40 45

50 Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

55 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
65 70 75 80

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|    |   |     |     |     |
|----|---|-----|-----|-----|
|    | Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val   |     |     |     |
|    | 85  | 90  | 95  |     |
| 5  | Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly   |     |     |     |
|    | 100   | 105 | 110 |     |
| 10 | Thr Ser Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala       |     |     |     |
|    | 115   | 120 | 125 |     |
| 15 | Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp   |     |     |     |
|    | 130   | 135 | 140 |     |
| 20 | Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Val Arg   |     |     |     |
|    | 145   | 150 | 155 | 160 |
|    | Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Phe Ser Leu Leu   |     |     |     |
|    | 165   | 170 | 175 |     |
| 25 | Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu   |     |     |     |
|    | 180   | 185 | 190 |     |
| 30 | Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile   |     |     |     |
|    | 195   | 200 | 205 |     |
| 35 | Leu Asn Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val   |     |     |     |
|    | 210   | 215 | 220 |     |
|    | Tyr Ile   |     |     |     |
|    | 225   |     |     |     |
| 40 | <210> 4   |     |     |     |
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|    | <213> hepatitis B virus   |     |     |     |
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| 50 | ccaccaaact ctgcaagatc ccagagttag aggcctgtat ttccctgctg gtggctccag |     | 120 |     |
|    | ttcaggaaca gtaaacccctg ttccgacttc tgtctctcac acatcgtaa tcttctcgag |     | 180 |     |
|    | gattgggtc cctgcgctga acatggagaa catcacatca ggattcctag gaccctgct   |     | 240 |     |
| 55 | cgtgttacag gcggggttt tcttgttgc aagaatcctc acaataccgc agagtctaga   |     | 300 |     |
|    | ctcgtggtgg acttctctca atttcttagg gggactacc gtgtgtcttg gccaaaattc  |     | 360 |     |

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|    |  |     |
|----|--|-----|
|    | gcagtccccca acctccaatc actcaccaac ctcctgtcct ccaacttgc tcggattatcg | 420 |
| 5  | ctggatgtat ctgcggcgtt ttatcatctt cctttcatc ctgctgctat gcctcatctt   | 480 |
|    | cttgggggtt cttctggact atcaaggtat gttgccgtt tgtcctctaa ttccaggatc   | 540 |
|    | ttcaaccacc agcacgggac catcagaac ctgcacgact cctgctcaag gaaactctat   | 600 |
| 10 | gtatccctcc tggctgtta ccaaaccttc ggacggaaat tgcacctgtta ttccatccc   | 660 |
|    | atcatcctgg gcttcggaa aattcctatg ggagtgggccc tcagcccggtt tctcctggct | 720 |
| 15 | cagtttacta gtgcatttg ttcaagtgggtt cgtagggctt tccccactg tttggctttc  | 780 |
|    | agttatatgg atgatgtggt attggggcc aagtctgtat cgcatcttga gtccctttt    | 840 |
|    | accgctgtta ccaattttct tttgtctttg ggtatacatt taaaaccctca caaaacaaaa | 900 |
| 20 | agatgggtc actcttaca tttcatgggc tatgtcattt gatgttatgg gtcattgcca    | 960 |
|    | caagatcaca tcagacagaa aa   | 982 |
| 25 | <210> 5<br><211> 268<br><212> PRT<br><213> hepatitis B virus       |     |
| 30 | <400> 5  |     |
|    | Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile    |     |
|    | 1 5 10 15  |     |
| 35 | Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys    |     |
|    | 20 25 30   |     |
| 40 | Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln    |     |
|    | 35 40 45   |     |
| 45 | Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro    |     |
|    | 50 55 60   |     |
|    | Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu    |     |
|    | 65 70 75 80  |     |
| 50 | Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala    |     |
|    | 85 90 95   |     |
| 55 | Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val    |     |
|    | 100 105 110  |     |

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Ala Arg Leu Ser Ser Asn Ser Arg Ile Phe Asn His Gln His Gly Thr  
115 120 125

5

Met Gln Asn Leu His Asp Ser Cys Ser Arg Lys Leu Tyr Val Ser Leu  
130 135 140

10

Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

15 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

20 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

25 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

30 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr  
225 230 235 240

35 Lys Arg Trp Gly His Ser Leu His Phe Met Gly Tyr Val Ile Gly Cys  
245 250 255

40 Tyr Gly Ser Leu Pro Gln Asp His Ile Arg Gln Lys  
260 265

45 <210> 6  
<211> 226  
<212> PRT  
<213> hepatitis B virus

<400> 6

50 Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln  
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55 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
20 25 30

- 7 -

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Thr Val Cys  
35 40 45

5 Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

10 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe  
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
85 90 95  
15

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly  
100 105 110

20 Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala  
115 120 125

25 Gln Gly Asn Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
130 135 140

30 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys  
145 150 155 160

35 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175  
Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
180 185 190

40 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile  
195 200 205

45 Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
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50 Tyr Ile  
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<210> 7  
<211> 1045

<212> DNA  
<213> hepatitis B virus

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| cagcagcgcc | tcctcctgcc | tcctccaatc  | ggcagtcagg  | aagacagcct   | actcccatt   | 60         |      |
| 5          | ctccacactt | aagagacagt  | catttcagg   | ccatgcagg    | gaactccagc  | acattccacc | 120  |
|            | aagctctgct | agatcccaga  | gtgaggggccc | tatattttcc   | tgctggtggc  | tccagttccg | 180  |
|            | gaacagtaaa | ccctgttccg  | actactgcct  | ctccccatatac | gtcaatcttc  | tcgaggactg | 240  |
| 10         | gggaccctgc | accgaacatg  | gagagcacca  | catcaggatt   | cctaggaccc  | ctgctcgcgt | 300  |
|            | tacaggcggg | gtttttcttg  | ttgacaagaa  | tcctcacaat   | accacagagt  | ctagactcg  | 360  |
| 15         | ggtgacttc  | tctcaatttt  | ctaggggaa   | cacccaagtg   | tcctggccaa  | aatttgcagt | 420  |
|            | ccccaacctc | caatcactca  | ccaaccttct  | gtcctccaaat  | ttgtcctgggt | tatcgctgga | 480  |
|            | tgtgtctgcg | gcgttttatac | atttcctct   | tcatcctgct   | gctatgcctc  | atcttcttgt | 540  |
| 20         | ggggtcttct | ggactaccaa  | ggtatgtgc   | ccgtttgtcc   | tctacttcca  | ggaacatcaa | 600  |
|            | ctaccagcac | gggaccatgc  | aagacctgca  | cgactcctgc   | tcaaggaacc  | tctatgttcc | 660  |
| 25         | cctcttgttg | ctgtacaaaa  | ccttcggacg  | gaaattgcac   | ttgtattccc  | atcccatcat | 720  |
|            | cttggcctt  | cgcaagattc  | ctatggagt   | gggcctcagt   | ccgtttctcc  | tggctcagtt | 780  |
|            | tactagtgcc | atttgtttag  | tggttcgtag  | ggctttcccc   | cactgtttgg  | cttttagtta | 840  |
| 30         | tatggatgat | gtggtattgg  | gggccaagtc  | tgtacaacay   | cttgaatccc  | tttttaccgc | 900  |
|            | tgttaccaat | tttcttttgt  | cttgggtat   | acatttaaac   | cctactaaaa  | ccaaacgttg | 960  |
| 35         | gggctactcc | cttaacttca  | tggatatgt   | aattggaagt   | tgggtacct   | taccacaaga | 1020 |
|            | acatattgt  | cacaaaatca  | gacaa       |              |             |            | 1045 |

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| 40 | <210> | 8                 |  |
|    | <211> | 271               |  |
|    | <212> | PRT               |  |
|    | <213> | hepatitis B virus |  |

|    |       |   |  |
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| 45 | <400> | 8 |  |
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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Asp | Trp | Gly | Pro | Cys | Thr | Glu | His | Gly | Glu | His | His | Ile | Arg | Ile |
| 1   |     |     |     |     |     |     | 5   |     |     | 10  |     |     |     | 15  |     |

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 50 | Pro | Arg | Thr | Pro | Ala | Arg | Val | Thr | Gly | Gly | Val | Phe | Leu | Val | Asp | Lys |
|    |     |     |     |     |     |     | 20  |     | 25  |     |     |     | 30  |     |     |     |

|    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 55 | Asn | Pro | His | Asn | Thr | Thr | Glu | Ser | Arg | Leu | Val | Val | Asp | Phe | Ser | Gln |
|    |     |     |     |     |     |     | 35  |     | 40  |     |     |     | 45  |     |     |     |

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Phe Ser Arg Gly Asn Thr Gln Val Ser Trp Pro Lys Phe Ala Val Pro  
50 55 60

5 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
65 70 75 80

10 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
10 85 90 95

15 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
100 105 110

20 Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
115 120 125

25 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140

30 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

35 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

40 Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

45 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

50 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

55 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
225 230 235 240

50 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
245 250 255

55 Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys Ile Arg Gln  
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<211> 226  
<212> PRT  
<213> hepatitis B virus

5 <220>  
<221> MISC\_FEATURE  
<222> (208)..(208)  
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10 <400> 9

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Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
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20

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Lys Cys  
35 40 45

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Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

30 35

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
65 70 75 80

Ile Ile Phe Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu Trp Gly  
85 90 95

40

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly  
100 105 110

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala  
115 120 125

45 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
130 135 140

50

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg  
145 150 155 160

55

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu

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180

185

190

|    |  |      |
|----|--|------|
| 5  | Leu Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Xaa        |      |
|    | 195  | 200  |
|    | 205  |      |
| 10 | Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val        |      |
|    | 210  | 215  |
|    | 220  |      |
|    | Tyr Ile  |      |
|    | 225  |      |
| 15 | <210> 10   |      |
|    | <211> 1021   |      |
|    | <212> DNA  |      |
|    | <213> hepatitis B virus  |      |
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|    | gagacagtca tcctcaggcc atgcagtggaa actccacaac ttccaccaa gctctgctag      | 120  |
| 25 | atccccgagt gaggggcctc tattttcctg ctggggctc cagttccggg acagtaaacc       | 180  |
|    | ctgttccgac tactgcctct cccatatcgt caatcttctc gaggactggg gaccctgcac      | 240  |
| 30 | tgaacatggaa gagcacaaca tcaggattcc taggaccctt gtcgtgtt caggcggtgt       | 300  |
|    | ttttcttgtt gacaagaatc ctcacaatac cacagagtct agactcgtgg tggacttctc      | 360  |
| 35 | tcaattttct agggaaagca cccgcgtgtc ctggccaaaa ttgcgtgtcc ccaacctcca      | 420  |
|    | atcactcacc aacctttgtt cttccaaattt gtcctggcta tcgctggatg tgtctgcggc     | 480  |
|    | gttttatcat cttccctttc atcctgtgtc tatgcctcat cttcttgttg gttcttctgg      | 540  |
| 40 | attaccaagg tatgttgcctt gtttgcctc tacttccagg aacgtcaact accagcacgg      | 600  |
|    | gaccatgcaa gacctgcacg attcctgtgtc aaggaacctc tatgtttccc tcatgttgt      | 660  |
| 45 | gtacaaaacc ttccggacggaa aactgcactt gtattcccat cccatcatcc tgggctttcg    | 720  |
|    | caagatttccat atgggagttgg gcctcagtcc gtttcttcttgc actcagttta ctatgtccat | 780  |
|    | ttgttcagtg gttcgttaggg ctttccccca ctgtttggct ttcaagttata tggatgtatgt   | 840  |
| 50 | ggtattgggg gccaagtctg tacaacatct tgagtccctt tataccgcttta ttaccaattt    | 900  |
|    | tcttttgtct ttgggtatac atttaaaccc taataaaacc aagcgatggg gttactccct      | 960  |
| 55 | taacttcatg ggatatgtca ttggaaagttt gggactttta ccacaggaac atattgtgt      | 1020 |
|    | c  | 1021 |

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<210> 11  
<211> 267  
<212> PRT  
5 <213> hepatitis B virus  
  
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10 Glu Asp Trp Gly Pro Cys Thr Glu His Gly Glu His Asn Ile Arg Ile  
1 5 10 15  
  
Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys  
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15  
Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
35 40 45  
  
20 Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro  
50 55 60  
  
25 Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
65 70 75 80  
  
30 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala  
85 90 95  
  
35 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
100 105 110  
Ala Arg Leu Ser Ser Thr Ser Arg Asn Val Asn Tyr Gln His Gly Thr  
115 120 125  
  
40 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140  
  
45 Met Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160  
  
50 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175  
  
Pro Phe Leu Leu Thr Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190  
55 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val

- 13 -

195                    200                    205

5    Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Thr Ala Ile  
      210                    215                    220

10    Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr  
      225                    230                    235                    240

15    Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
      245                    250                    255

20    Trp Gly Thr Leu Pro Gln Glu His Ile Val Leu  
      260                    265

25    <210> 12  
<211> 226  
<212> PRT  
<213> hepatitis B virus

30    <220>  
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<222> (172)..(172)  
<223> Xaa is any amino acid

35    <400> 12

      Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln  
      1                    5                    10                    15

      Ala Val Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
      20                    25                    30

40    Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Glu Ala Pro Ala Cys  
      35                    40                    45

45    Pro Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
      50                    55                    60

50    Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
      65                    70                    75                    80

55    Ile Ile Phe Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu Leu Val  
      85                    90                    95

      Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly

- 14 -

|    | 100   | 105 | 110 |
|----|---|-----|-----|
| 5  | Thr Ser Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala         |     |     |
|    | 115   | 120 | 125 |
| 10 | Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp     |     |     |
|    | 130   | 135 | 140 |
| 15 | Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg     |     |     |
|    | 145   | 150 | 155 |
|    | Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Xaa Leu Ser Leu Leu     |     |     |
|    | 165   | 170 | 175 |
| 20 | Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu     |     |     |
|    | 180   | 185 | 190 |
| 25 | Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile     |     |     |
|    | 195   | 200 | 205 |
| 30 | Leu Ser Pro Phe Ile Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val     |     |     |
|    | 210   | 215 | 220 |
| 35 | Tyr Ile   |     |     |
|    | 225   |     |     |
| 40 | <210> 13<br><211> 953<br><212> DNA<br><213> hepatitis B virus       |     |     |
| 45 | agtcatcctc aggccatgca gtggaaactcc agcacattcc accaagctct gctagatccc  | 60  |     |
|    | agagtgaggg gcctatactt tcctgctggt ggctccagtt caggaacagt aaaccctgtt   | 120 |     |
|    | ccgactactg cctctcccat atcgtaatc ttctcgagga ctggggaccc tgcaccgaat    | 180 |     |
|    | atggagagca ccacatcagg attccttagga cccctgctcg tgttacaggc ggggttttc   | 240 |     |
| 50 | ttgttgacaa gaatcctcac aataccacag agtctagact cgtgggtggac ttctctcaat  | 300 |     |
|    | tttcttaggg gagcacccgc gtgtcctggc caaaaatttgc agtccccaaac ctccaatcac | 360 |     |
| 55 | tcactaacct cttgtcctcc aatttgtctt ggttatcgct ggatgtgtct gggcgtttt    | 420 |     |
|    | atcatcttcc tcttcatcct gctgctatgc ctcatcttct tttttttttt tctggactac   | 480 |     |

- 15 -

caaggatatgt tgcccgtttg tcctctactt ccaggaacat caactaccag cacgggacca 540  
tgcaagacct gcacgactcc tgctcaagga acctctatgt ttccctcttg ttgttgtaca 600  
5 aaaccttcgg acggaaattt cacttgtatt cccatcccat catcttgggc tttcgcaaga 660  
ttcctatggg agtgggcctc agtccgttcc tcatggctca gtttactagt gccatttggtt 720  
10 cagtggttcg tagggcttcc cccactgtt tggttttag ttagtggat gatgtggat 780  
tgggggccaa gtctgcacaa catcttgaat cccttttac cgctattacc aattttcttt 840  
tgtcttggg tatacattta aaccmtaata aaaccaaacg ttggggctat tcccttaact 900  
15 ttatggata tggaaatttggaa agttggggtc ctgcccaggg aagatggcag ggg 953

<210> 14  
20 <211> 309  
<212> PRT  
<213> hepatitis B virus

<220>  
25 <221> MISC\_FEATURE  
<222> (288)...(288)  
<223> Xaa is any amino acid

30 <400> 14  
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1 5 10 15

35 Ala Arg Ser Gln Ser Glu Gly Pro Ile Leu Ser Cys Trp Trp Leu Gln  
20 25 30

40 Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser His Ile Val  
35 40 45

45 Asn Leu Leu Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His  
50 55 60

Ile Arg Ile Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu  
65 70 75 80

50 Val Asp Lys Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp  
85 90 95

55 Phe Ser Gln Phe Ser Arg Gly Ser Thr Arg Val Ser Trp Pro Lys Phe  
100 105 110

- 16 -

Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu  
115 120 125

5 Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu  
130 135 140

10 His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro  
145 150 155 160

15 Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln  
165 170 175

20 His Gly Thr Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr  
180 185 190

Val Ser Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu  
195 200 205

25 Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val  
210 215 220

30 Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser  
225 230 235 240

35 Val Val Arg Arg Ala Phe Pro His Cys Leu Val Phe Ser Tyr Val Asp  
245 250 255

40 Asp Val Val Leu Gly Ala Lys Ser Ala Gln His Leu Glu Ser Leu Phe  
260 265 270

Thr Ala Ile Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Xaa  
275 280 285

45 Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Gly  
290 295 300

50 Ile Gly Ser Trp Gly  
305

55 <210> 15  
<211> 307  
<212> PRT  
<213> hepatitis B virus

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<220>  
<221> MISC\_FEATURE  
<222> (298)..(298)  
5 <223> Xaa is any amino acid

<220>  
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10 <222> (300)..(300)  
<223> Xaa is any amino acid

15 <400> 15

15 Gln Pro Thr Pro Ile Ser Pro Pro Leu Arg Asp Ser His Pro Gln Ala  
1 5 10 15

20 Met Gln Trp Asn Ser Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg  
20 25 30

25 Val Arg Gly Leu Tyr Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val  
35 40 45

30 Asn Pro Val Pro Thr Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg  
50 55 60

35 Thr Gly Asp Pro Ala Pro Asn Met Glu Ser Thr Thr Ser Gly Phe Leu  
65 70 75 80

40 Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe  
100 105 110

45 Leu Gly Gly Ala Pro Ala Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr  
115 120 125

50 Ser Asn His Ser Leu Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg  
130 135 140

55 Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu  
145 150 155 160

Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro  
165 170 175

- 18 -

Val Cys Pro Leu Leu Pro Gly Thr Ser Thr Thr Ser Thr Gly Pro Cys  
180 185 190

5

Lys Thr Cys Thr Thr Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys  
195 200 205

10

Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro  
210 215 220

15

Ser Ser Trp Ala Phe Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg  
225 230 235 240

30

Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly  
245 250 255

25

Leu Ser Pro Thr Val Trp Phe Ser Val Met Trp Met Met Tyr Trp  
                  260                 265                 270

30

Gly Pro Ser Leu His Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro  
275 280 285

30

Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa Thr Xaa Ile Lys Pro Asn  
 290 295 300

30

35

Val Gly Ala  
305

<210> 16  
<211> 988  
<212> DNA  
<213> hep

15

<400> 16  
ccaaatccqca qtcagqaaga caggctactc ccatactctcc acctctaaga gacagtcatc 60

ctcaggccat gcagtggAAC tccagcacAT tccaccaAGC tctgCTAqAT cccaaqAGTqA 120

ggggcctata ctttcctgct ggtggctcca gttccggAAC agtaaaACCCt gttccgacta 180

55

caagaatcct cacaataccca cagagtcttag actcggtggtg gacttctctc aattttcttag 360

- 19 -

|    |   |     |
|----|---|-----|
|    | cctcttgc tccaatttgt cctggttatc gctggatgtg tctgcggcgt tttatcatct     | 480 |
| 5  | tcctcttcat cctgctgcta tgcctcatct tcttgttggt tcttctggac taccaaggtta  | 540 |
|    | tgttgcggcgt ttgtccctcta cttccaggaa catcaactac cagcacggga ccatgcaaga | 600 |
|    | cctgcacgac tcctgctcaa ggaacctcta tgttccctc ttgttgctgt aaaaaacctt    | 660 |
| 10 | cggacggaaa ttgcacttgt attcccatcc catcatcttggc ggcttcgca agattcctat  | 720 |
|    | gggagtgggc ctcagtcgtt ttctccctggc tcagttact agtgcattt gttcagtggt    | 780 |
| 15 | tcgttagggct ttccccact gtttggcttt cagttatatg gatgatgtgg tattggggc    | 840 |
|    | caagtcgtta caacatcttggc aatccctttt taccgctgtt accaattttc ttttgcctt  | 900 |
|    | gggtatacat ttaaacccta ctaaaactaa acgttggggc tactccctta acttcatggg   | 960 |
| 20 | atatgttaatt ggaagttggg gtaccttg                                     | 988 |
|    | <210> 17  |     |
| 25 | <211> 258   |     |
|    | <212> PRT   |     |
|    | <213> hepatitis B virus   |     |
|    | <400> 17  |     |
| 30 | Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His His Ile Arg Ile     |     |
|    | 1 5 10 15   |     |
| 35 | Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys     |     |
|    | 20 25 30  |     |
| 40 | Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln     |     |
|    | 35 40 45  |     |
| 45 | Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro     |     |
|    | 50 55 60  |     |
|    | Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu     |     |
|    | 65 70 75 80   |     |
| 50 | Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala     |     |
|    | 85 90- 95   |     |
| 55 | Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val     |     |
|    | 100 105 110   |     |

- 20 -

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
115 120 125

5 Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140

10 Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

15 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

20 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

25 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

30 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
225 230 235 240

35 Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
245 250 255

Trp Gly

40 <210> 18  
<211> 226  
<212> PRT  
<213> hepatitis B virus

45 <400> 18

50 Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln  
1 5 10 15

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
20 25 30

55 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys  
35 40 45

- 21 -

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

5 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
65 70 75 80

10 Ile Ile Phe Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu Leu Val  
85 90 95

15 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly  
100 105 110

20 Thr Ser Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Thr Pro Ala  
115 120 125

25 Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
130 135 140

Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Arg  
145 150 155 160

30 Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175

35 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
180 185 190

40 Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile  
195 200 205

45 Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
210 215 220

Tyr Ile  
225

50 <210> 19  
<211> 1043  
<212> DNA  
<213> hepatitis B virus

55 <400> 19  
tccgcctcct gcctccacca atcgccagtc aggaaggcaa cctaccccgcc tctctccacc 60

- 22 -

|    |   |      |
|----|---|------|
|    | tttgagagac actcatcctc agggcgtgca gtggaactcc acaaccttcc accaaactct   | 120  |
| 5  | gcaagatccc agagtgaggg gcctgtatct ccctgctgg ggcctccagg caggaacagc    | 180  |
|    | aaaccctgtt ccgactactg cctctcgctt atcgtcaatc ttctcgagga ttggggaccc   | 240  |
|    | tgcgctgaac atggagaaca tcacatcagg actccttagga ccccttctcg tgttacaggc  | 300  |
| 10 | ggggtttttc ttgttgacaa gaatcctcac aataccgcag agtctagact cgtgggtggac  | 360  |
|    | ttctctcagt tttcttagggg gaactaccgt gtgtcttggc caaaattcgc ggtccccaac  | 420  |
| 15 | ctccaatcac tcaccaacct cctgtcctcc gacttgcctt gttatcgct ggatgtatct    | 480  |
|    | gcggcggtttt atcatattcc tcttcattcc gctgctatgc ctcatcttct tgttggttct  | 540  |
|    | tctggactat caaggtatgt tgcccgtttg tcctctaatt ccaggatcct caaccaccag   | 600  |
| 20 | cacgggaaca tgccgaacct gcacgactcc tgctcaagga acctctatgt atccctcctg   | 660  |
|    | ttgctgtacc aaaccttcgg acggaaattt cacctgtatt cccatcccat catcttggc    | 720  |
| 25 | tttcggaaaa ttccttatggg agtgggcctc agcccgttcc tcctggctca gtttactagt  | 780  |
|    | gccatttgtt cagtggttcg tagggcttcc cccactgtt tggctttagt ttatatggat    | 840  |
|    | gatgtggat tggggggccaa gtctgtacag catcttgagt cccttttac cgctgttacc    | 900  |
| 30 | aattttctt tgcctttggg tatacattta acccctaaca aaacaaagag atggggttac    | 960  |
|    | tctctaaatt ttatggctta tgtcatttggg agttatgggt ctttgcacaca agaacacatt | 1020 |
|    | atactaaaaa tcaaagattt ttt   | 1043 |
| 35 |   |      |

|       |   |
|-------|---|
| <210> | 20  |
| <211> | 258   |
| <212> | PRT   |
| 40    | hepatitis B virus   |
| <400> | 20  |
| 45    | Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Thr |
|       | 1 5 10 15   |
|       | Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys |
|       | 20 25 30  |
| 50    | Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln |
|       | 35 40 45  |
| 55    | Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val Pro |
|       | 50 55 60  |

- 23 -

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asp Leu Ser Trp Leu  
65 70 75 80

5

Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala  
85 90 95

10

Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val  
100 105 110

15

Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Asn  
115 120 125

20

Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140

25

Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

30

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

35

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

40

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

45

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Thr Pro Asn Lys Thr  
225 230 235 240

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
245 250 255

50

Tyr Gly

55 <210> 21  
<211> 226  
<212> PRT

- 24 -

<213> hepatitis B virus

<400> 21

5 Met Glu Asn Ile Thr Ser Gly Leu Leu Gly Pro Leu Leu Val Leu Gln  
1 5 10 15

10 Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
20 25 30

15 Asp Ser Trp Trp Thr Ser Leu Ser Phe Leu Gly Gly Thr Thr Val Cys  
35 40 45

Leu Gly Gln Asn Ser Arg Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

20 Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Tyr Leu Arg Arg Phe  
65 70 75 80

25 Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val  
85 90 95

30 Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly  
100 105 110

35 Ser Ser Thr Thr Ser Thr Gly Thr Cys Arg Thr Cys Thr Thr Pro Ala  
115 120 125

40 Gln Gly Thr Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
130 135 140

45 Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys  
145 150 155 160

50 Phe Leu Trp Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175

55 Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
180 185 190

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Ser Ile  
195 200 205

Leu Ser Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val

- 25 -

210

215

220

Tyr Ile

5 225

<210> 22

<211> 1027

10 <212> DNA

<213> hepatitis B virus

<400> 22

15 cgcctcctgc ctccaccaat cgccagtcag gaaggcagcc gaccccactg tctccacatt 60  
tgagagacac tcatcctcag gccgtgcagt ggaactccac aacccttccac caaactctgc 120  
aagatcccag agtgagaggc ctgtatcc ctgctggtgg ctccagttca ggaacagtaa 180  
20 accctgttcc gaccactgcc tctcccttat cgtcaatctt ctcgaggatt ggggaccctg 240  
cgctgaacat ggagaacatc acatcaggat tccttaggacc ctttctcggt ttacaggcgg 300  
25 ggtttttctt gttgacaaga atcctcacaa taccgcagag tctagactcg tggtgactt 360  
ctctcagttt tctagggaa accaccgtgt gtcttggcca aaattcgca tccccaaacct 420  
ccaatcactc accaacacctcc tgtcctccaa cttgtcctgg ttatcgctgg atgtgtctgc 480  
30 ggcgttttat catattcctc ttcatcctgc tgctatgcct catcttcttgc ttggttcttc 540  
tggactatca aggtatgttgc cccgtttgtc ctctaattcc aggatcctca accaccagca 600  
35 cgggaccatg ccgaacctgc acgactcctg ctcaaggaac ctctatgtat ccctcctgtt 660  
gctgtaccaa accttcggac gaaattgca octgtattcc catccatca tcttggctt 720  
tcgcaaaatt cctatggag tgggctcag cccgttttc atggctcagt ttactagtgc 780  
40 catttgttca gtgggtcgta gggctttccc ccactgtttg gctttcagtt atgtggatga 840  
tgtggatttgc ggggccaagt ctgtatcgca tcttgagtcc ctttttaccg ctgttaccaa 900  
45 ttttcttttgc tctttggta tacatttaaa ccctaacaaa acgaaaagat ggggttactc 960  
tttaaattttt atggggatgc ttatggatgc ttatgggtcc ttgccacaag aacacatcgt 1020  
aaaaaaa 1027

50

<210> 23

<211> 264

<212> PRT

<213> hepatitis B virus

55

<400> 23

- 26 -

Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg Ile  
1 5 10 15

5 Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys  
20 25 30

10 Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser Gln  
35 40 45

15 Phe Ser Arg Gly Asn His Arg Val Ser Trp Pro Lys Phe Ala Val Pro  
50 55 60

Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu  
65 70 75 80

20 Ser Leu Asp Val Ser Ala Ala Phe Tyr His Ile Pro Leu His Pro Ala  
85 90 95

25 Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val  
100 105 110

30 Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly Thr  
115 120 125

35 Met Pro Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140

Leu Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

40 Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

45 Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

50 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Val Asp Asp Val Val  
195 200 205

55 Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys Thr

- 27 -

- 28 -

- 29 -

Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly  
20 25 30

5

Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Thr Ser Arg Ile Phe Asn  
35 40 45

10

His Gln His Gly Ser Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn  
50 55 60

15 Leu Tyr Val Ser Leu Met Leu Leu Tyr Gln Thr Phe Gly Arg Lys Leu  
65 70 75 80

20 His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met  
85 90 95

25 Gly Val Gly Leu Ser Pro Phe Leu Met Ala Gln Phe Thr Ser Ala Ile  
100 105 110

Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr  
115 120 125

30 Val Asp Asp Val Val Leu Gly Ala Lys Ser Val Ser His Leu Glu Ser  
130 135 140

35 Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu  
145 150 155 160

40 Asn Pro His Lys Thr Lys Arg Trp Gly Tyr Ser Leu His Phe Met Gly  
165 170 175

45 Tyr Val Ile Gly Cys Tyr Gly Ser Leu Pro  
180 185

50 <210> 27  
<211> 160 /  
<212> PRT  
<213> hepatitis B virus

55 <220>  
<221> MISC\_FEATURE  
<222> (160)..(160)  
<223> Xaa is any amino acid

- 30 -

<400> 27

Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe  
1 5 10 15

5

Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp  
20 25 30

10

Tyr Arg Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly Ser Ser Thr  
35 40 45

15

Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala Gln Gly Thr  
50 55 60

20

Ser Met Tyr Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp Gly Asn Cys  
65 70 75 80

Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp  
85 90 95

25

Glu Trp Ala Ser Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe  
100 105 110

30

Val Gln Trp Phe Val Gly Leu Ser Pro Ile Val Trp Leu Ser Val Met  
115 120 125

35

Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Arg Ile Leu Ser Pro  
130 135 140

40

Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile Xaa  
145 150 155 160

<210> 28

<211> 1029

45

<212> DNA

<213> hepatitis B virus

<400> 28

50

cgcctccacc tgcctccacc atcggcagtc aggaagaaaag cctactccca tctctccacc 60

tctaagagac agtcatcctc aggccatgca gtggaactcc agcacattcc accaagctct 120

gctagatccc aragtgagrg gcctatactt tcctgctggc ggctccagg ccggAACAGT 180

55

aaaccctgtt ccgactactg cctctccat atcgtcaatc ttctcgagga ctggggaccc 240

tgcaccgaat atggagagca caacatcagg attccttagga cccctgctcg tgttacaggc 300

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|    |   |      |
|----|---|------|
|    | ggggtttttc ttgttgacaa gaatcctcac aataccacag agtctagact cgtggtggac   | 360  |
| 5  | ttctctcaat tttcttagggg gaggcacccac gtgtcctggc caaaaattgc agtccccaac | 420  |
|    | ctccaatcac tcaccaacct ctgtcctcc aatttgcct ggatatcgct ggatgtgtct     | 480  |
|    | gcggcggttt atcatcttcc tcttcatcct gctgctatgc ctcatcttct tgtkggtct    | 540  |
| 10 | tctggactac caaggtatgt tgcccgtttgc ttctctactt ccaggaacat caactaccag  | 600  |
|    | cacgggacca tgcaagacct gcacgattcc tgctcaagga acctctatgt ttccctcttg   | 660  |
| 15 | ttgctgtaca aaaccttcgg acggaaatttgc cacttgtatt cccatccat catcttggc   | 720  |
|    | tttcgcaaga ttcctatggg agtgggcctc agtccgttcc tcctggctca gtttactagt   | 780  |
|    | gccatttgc ttcatgggtcg tagggcttcc ccccactgtt tggctttcag ttatatggat   | 840  |
| 20 | gatgtggtat tgggggc当地 gtctgtacaa catcttgcat cccttttac cgctgttacc     | 900  |
|    | aattttcttt tgcattttggg tatacatat aaccctacta aaactaaacg ttggggctac   | 960  |
|    | tcccttaact tcatggata tgtaatttgc agttgggtt ccttaccaca ggaacatatt     | 1020 |
| 25 | gtacacaaa   | 1029 |
|    | <br>  |      |
| 30 | <210> 29  |      |
|    | <211> 268   |      |
|    | <212> PRT   |      |
|    | <213> hepatitis B virus   |      |
|    | <br>  |      |
| 35 | <400> 29  |      |
|    | Glu Asp Trp Gly Pro Cys Thr Glu Tyr Gly Glu His Asn Ile Arg Ile     |      |
|    | 1 5 10 15   |      |
| 40 | Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys     |      |
|    | 20 25 30  |      |
|    | <br>  |      |
| 45 | Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln     |      |
|    | 35 40 45  |      |
|    | <br>  |      |
| 50 | Phe Ser Arg Gly Ser Thr His Val Ser Trp Pro Lys Phe Ala Val Pro     |      |
|    | 50 55 60  |      |
|    | <br>  |      |
|    | Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu     |      |
|    | 65 70 75 80   |      |
| 55 | Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala     |      |
|    | 85 90 95  |      |

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Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Pro Arg Tyr Val  
100 105 110

5

Ala Arg Leu Ser Ser Thr Ser Arg Asn Ile Asn Tyr Gln His Gly Thr  
115 120 125

10

Met Gln Asp Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu  
130 135 140

15

Leu Leu Leu Tyr Lys Thr Phe Gly Arg Lys Leu His Leu Tyr Ser His  
145 150 155 160

20

Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val Arg  
180 185 190

25

Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

30

Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Phe Thr Ala Val  
210 215 220

35

Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Thr Lys Thr  
225 230 235 240

40

Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly Ser  
245 250 255

Trp Gly Thr Leu Pro Gln Glu His Ile Val His Lys  
260 265

45

<210> 30  
<211> 226  
<212> PRT  
50 <213> hepatitis B virus

<220>  
<221> MISC\_FEATURE  
<222> (95)..(95)  
55 <223> Xaa is any amino acid

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<400> 30

Met Glu Ser Thr Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu Gln  
1 5 10 15

5

Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser Leu  
20 25 30

10

Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro Thr Cys  
35 40 45

15

Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro Thr Ser  
50 55 60

20

Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
65 70 75 80

25

Ile Ile Phe Leu Phe Ile Leu Leu Cys Leu Ile Phe Leu Xaa Val  
85 90 95

30

Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu Pro Gly  
100 105 110

.

Thr Ser Thr Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile Pro Ala  
115 120 125

35

Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Ser Asp  
130 135 140

40

Gly Asn Cys Thr Cys Ile Pro Ser Ser Trp Ala Phe Ala Arg  
145 150 155 160

45

Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu  
165 170 175

50

Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu  
180 185 190

55

Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile  
195 200 205

.

55

Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val  
210 215 220

- 34 -

Tyr Ile  
225

|                             |   |      |
|-----------------------------|---|------|
| 5                           | <210> 31  |      |
|                             | <211> 1035  |      |
|                             | <212> DNA   |      |
|                             | <213> hepatitis B virus   |      |
| 10                          | <400> 31  |      |
|                             | ctcctcctgc ctccaccaat cggcagtcag gaagacagcc tacacccatc tctccacacc   | 60   |
| 15                          | taagagacag tcatcctcag gccatgcagt ggaactccag cacattccac caagctctgc   | 120  |
|                             | tagatcccag agtgaggggc ctatactttc ctgctggtgg ctccagttca ggaacagtaa   | 180  |
|                             | accctgttcc gactactgcc tctcccatat cgtcaatctt ctcgaggact ggggaccctg   | 240  |
| 20                          | caccgaatat ggagagcacc acatcaggat tccttaggacc cctgctcggt ttacaggcgg  | 300  |
|                             | ggtttttctt gttgacaaga atcctcacaa taccacagag tctagactcg tggtgactt    | 360  |
| 25                          | ctctcaattt tctaggggaa gcacccacgt gtccctggcca aaatttgcag tccccaaacct | 420  |
|                             | ccaatcactc accaacctct tgtcctccaa tttgtcctgg ttatcgctgg atgtgtctgc   | 480  |
|                             | ggcggtttat catttcctc ttcatcctgc tgctatgcct catttcttg ttggttcttc     | 540  |
| 30                          | tggactacca aggtatgtg cccgtttgtc ctctacttcc aggaacatca actaccagca    | 600  |
|                             | cgggaccatg caagacactgc acgattcctg ctcaaggaac ctctatgttt ccctcttgg   | 660  |
| 35                          | gctgtacaaa accttcggac ggaaattgca ttgttattcc catcccatca tcttgggctt   | 720  |
|                             | tcgcaagatt cctatggag tgggcctcag tccgttttc ctggctcagt ttactagtgc     | 780  |
|                             | catttggta gtgggtcgta gggctttccc ccactgtttg gctttcagtt atatggatga    | 840  |
| 40                          | tgtggtattt ggggccaagt ctgtacaaca tcttgaatcc ctttttaccc ctgttaccaa   | 900  |
|                             | ttttcttttgc tctttggta tacatttaaa ccctrctaaa accaaacgtt ggggttactc   | 960  |
|                             | ccttaacttc atggatatg taatttggaaat ttgggttacc ttaccacagg aacatattgt  | 1020 |
| 45                          | acacaaaatc aaaca  | 1035 |
| 50 <210> 32                 |   |      |
| <211> 344                   |   |      |
| <212> PRT                   |   |      |
| <213> hepatitis B virus     |   |      |
| 55 <220>                    |   |      |
| <221> MISC_FEATURE          |   |      |
| <222> (312)..(312)          |   |      |
| <223> Xaa is any amino acid |   |      |

- 35 -

<400> 32

5 Ser Ser Cys Leu His Gln Ser Ala Val Arg Lys Thr Ala Tyr Thr His  
1 5 10 15

10 Leu Ser Thr Ser Lys Arg Gln Ser Ser Ser Gly His Ala Val Glu Leu  
20 25 30

15 Gln His Ile Pro Pro Ser Ser Ala Arg Ser Gln Ser Glu Gly Pro Ile  
35 40 45

20 Leu Ser Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp  
50 55 60

25 Tyr Cys Leu Ser His Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys  
65 70 75 80

30 Thr Glu Tyr Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ala Arg  
85 90 95

35 Val Thr Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Thr  
100 105 110

40 Glu Ser Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Ser Thr  
115 120 125

45 His Val Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr  
130 135 140

50 Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala  
145 150 155 160

55 Ala Phe Tyr His Leu Pro Leu His Pro Ala Ala Met Pro His Leu Leu  
165 170 175

50 Val Gly Ser Ser Gly Leu Pro Arg Tyr Val Ala Arg Leu Ser Ser Thr  
180 185 190

55 Ser Arg Asn Ile Asn Tyr Gln His Gly Thr Met Gln Asp Leu His Asp  
195 200 205

Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Tyr Lys Thr

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210                    215                    220

5 Phe Gly Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe  
225                    230                    235                    240

10 Arg Lys Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln  
245                    250                    255

Phe Thr Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys  
260                    265                    270

15 Leu Ala Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val  
275                    280                    285

20 Gln His Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser  
290                    295                    300

25 Leu Gly Ile His Leu Asn Pro Xaa Lys Thr Lys Arg Trp Gly Tyr Ser  
305                    310                    315                    320

30 Leu Asn Phe Met Gly Tyr Val Ile Gly Ser Trp Gly Thr Leu Pro Gln  
325                    330                    335

Glu His Ile Val His Lys Ile Lys  
340

35 <210> 33  
<211> 344  
<212> PRT  
<213> hepatitis B virus

40 <220>  
<221> MISC\_FEATURE  
<222> (309)..(309)  
<223> Xaa is any amino acid

45 <220>  
<221> MISC\_FEATURE  
<222> (327)..(327)  
50 <223> Xaa is any amino acid

<400> 33

55 Pro Pro Ala Ser Thr Asn Arg Gln Ser Gly Arg Gln Pro Thr Pro Ile  
1                    5                    10                    15

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Ser Pro Pro Leu Arg Asp Ser His Pro Gln Ala Met Gln Trp Asn Ser  
20 25 30

5 Ser Thr Phe His Gln Ala Leu Leu Asp Pro Arg Val Arg Gly Leu Tyr  
35 40 45

10 Phe Pro Ala Gly Gly Ser Ser Ser Gly Thr Val Asn Pro Val Pro Thr  
50 55 60

15 Thr Ala Ser Pro Ile Ser Ser Ile Phe Ser Arg Thr Gly Asp Pro Ala  
65 70 75 80

20 Pro Asn Met Glu Ser Thr Ser Gly Phe Leu Gly Pro Leu Leu Val  
85 90 95

Leu Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln  
100 105 110

25 Ser Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Ala Pro  
115 120 125

30 Thr Cys Pro Gly Gln Asn Leu Gln Ser Pro Thr Ser Asn His Ser Pro  
130 135 140

35 Thr Ser Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg  
145 150 155 160

40 Arg Phe Ile Ile Phe Leu Phe Ile Leu Leu Leu Cys Leu Ile Phe Leu  
165 170 175

Leu Val Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Leu  
180 185 190

45 Pro Gly Thr Ser Thr Ser Thr Gly Pro Cys Lys Thr Cys Thr Ile  
195 200 205

50 Pro Ala Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro  
210 215 220

55 Ser Asp Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe  
225 230 235 240

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|    |   |     |     |     |
|----|---|-----|-----|-----|
|    | Ala Arg Phe Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser     |     |     |     |
|    | 245   | 250 | 255 |     |
| 5  | Leu Leu Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val     |     |     |     |
|    | 260   | 265 | 270 |     |
| 10 | Trp Leu Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr     |     |     |     |
|    | 275   | 280 | 285 |     |
| 15 | Asn Ile Leu Asn Pro Phe Leu Pro Leu Leu Pro Ile Phe Phe Cys Leu     |     |     |     |
|    | 290   | 295 | 300 |     |
| 20 | Trp Val Tyr Ile Xaa Thr Leu Leu Lys Pro Asn Val Gly Val Thr Pro     |     |     |     |
|    | 305   | 310 | 315 | 320 |
| 25 | Leu Thr Ser Trp Asp Met Xaa Leu Glu Val Gly Val Pro Tyr His Arg     |     |     |     |
|    | 325   | 330 | 335 |     |
| 30 | Asn Ile Leu Tyr Thr Lys Ser Asn                                     |     |     |     |
|    | 340   |     |     |     |
| 35 | <210> 34  |     |     |     |
|    | <211> 980   |     |     |     |
|    | <212> DNA   |     |     |     |
|    | <213> hepatitis B virus   |     |     |     |
| 40 | <400> 34  |     |     |     |
|    | cagtccggaa ggcagcctac tcccttatct ccacctctaa gggacactca tcctcaggcc   | 60  |     |     |
|    | atgcagtgga actccaccac tttccatcaa actcttcaag atcccagagt cagggtctg    | 120 |     |     |
|    | tactttcctg ctgggtggctc cagttcagga acagtgagcc ctgctcagaa tactgcctct  | 180 |     |     |
|    | gccatatcggt caaccttctc gaagactggg gaccctgtac cgaacatgga gaacatcgca  | 240 |     |     |
|    | tcaggactcc taggaccctt gctcgcgtta caggcggggt ttttctcggtt gacaaaaatc  | 300 |     |     |
| 45 | ctcacaatac cacagagtct agactcgtgg tggacttctc tcaattttctt aggggaaaca  | 360 |     |     |
|    | cccggtgtgtc ttggccaaaa ttgcgcgtcc caaatctcca gtcactcacc aacttgttgt  | 420 |     |     |
| 50 | cctccaattt gtcctgggtta tcgctggatg tgtctgcggc gttttatcat cttccctctgc | 480 |     |     |
|    | atcctgctgc tatgcctcat cttcttgttg gttcttctgg actatcaagg tatgttgccc   | 540 |     |     |
|    | gtttgtcctc taattccagg atcatcaacc accagcacccg gaccatgcag aacctgcacg  | 600 |     |     |
| 55 | actcctgctc aaggaacctc tatgtttccc tcatgttgct gtacaaaacc tacggacgga   | 660 |     |     |
|    | aactgcacccgttattccat cccatcatct tgggcttgc caaaataacct atgggagtgg    | 720 |     |     |

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|    |  |     |
|----|--|-----|
|    | gcctcagtcc gtttctcttg gtcagttta ctagtgcgt ttgttcagtg gttcgtaggg    | 780 |
| 5  | ctttccccca ctgtctggct ttcagttata tggatgatgt ggtattgggg gccaaagtctg | 840 |
|    | tacaacatct tgagtccctt tatgccgctg ttaccaattt tctttgtct ttgggtatac   | 900 |
|    | atttaaaccc tcacaaaaca aaaagatggg gatattccct tcaattcatg ggatatgtaa  | 960 |
| 10 | ttgggggttg gggctccttg  | 980 |
|    | <210> 35   |     |
| 15 | <211> 258  |     |
|    | <212> PRT  |     |
|    | <213> hepatitis B virus  |     |
|    | <400> 35   |     |
| 20 | Glu Asp Trp Gly Pro Cys Thr Glu His Gly Glu His Arg Ile Arg Thr    |     |
|    | 1 5 10 15  |     |
| 25 | Pro Arg Thr Pro Ala Arg Val Thr Gly Gly Val Phe Leu Val Asp Lys    |     |
|    | 20 25 30   |     |
| 30 | Asn Pro His Asn Thr Thr Glu Ser Arg Leu Val Val Asp Phe Ser Gln    |     |
|    | 35 40 45   |     |
| 35 | Phe Ser Arg Gly Asn Thr Arg Val Ser Trp Pro Lys Phe Ala Val Pro    |     |
|    | 50 55 60   |     |
| 40 | Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp Leu    |     |
|    | 65 70 75 80  |     |
| 45 | Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro Ala    |     |
|    | 85 90 95   |     |
| 50 | Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr Val    |     |
|    | 100 105 110  |     |
| 55 | Ala Arg Leu Ser Ser Asn Ser Arg Ile Ile Asn His Gln His Arg Thr    |     |
|    | 115 120 125  |     |
|    | Met Gln Asn Leu His Asp Ser Cys Ser Arg Asn Leu Tyr Val Ser Leu    |     |
|    | 130 135 140  |     |
| 55 | Met Leu Leu Tyr Lys Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser His    |     |
|    | 145 150 155 160  |     |

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Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu Ser  
165 170 175  
5

Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Val Cys Ser Val Val Arg  
180 185 190

10 Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val Val  
195 200 205

15 Leu Gly Ala Lys Ser Val Gln His Leu Glu Ser Leu Tyr Ala Ala Val  
210 215 220

20 Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro His Lys Thr  
225 230 235 240

25 Lys Arg Trp Gly Tyr Ser Leu Gln Phe Met Gly Tyr Val Ile Gly Gly  
245 250 255

Trp Gly

30 <210> 36  
<211> 226  
<212> PRT  
<213> hepatitis B virus

35 <400> 36

40 Met Glu Asn Ile Ala Ser Gly Leu Leu Gly Pro Leu Leu Ala Leu Gln  
1 5 10 15

Ala Gly Phe Phe Ser Leu Thr Lys Ile Leu Thr Ile Pro Gln Ser Leu  
20 25 30

45 Asp Ser Trp Trp Thr Ser Leu Asn Phe Leu Gly Gly Thr Pro Val Cys  
35 40 45

50 Leu Gly Gln Asn Ser Gln Ser Gln Ile Ser Ser His Ser Pro Thr Cys  
50 55 60

55 Cys Pro Pro Ile Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg Phe  
65 70 75 80

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|    |   |     |     |     |
|----|---|-----|-----|-----|
|    | Ile Ile Phe Leu Cys Ile Leu Leu Leu Cys Leu Ile Phe Leu Leu Val       |     |     |     |
|    | 85  | 90  | 95  |     |
| 5  | Leu Leu Asp Tyr Gln Gly Met Leu Pro Val Cys Pro Leu Ile Pro Gly       |     |     |     |
|    | 100   | 105 | 110 |     |
| 10 | Ser Ser Thr Thr Ser Thr Gly Pro Cys Arg Thr Cys Thr Thr Pro Ala       |     |     |     |
|    | 115   | 120 | 125 |     |
| 15 | Gln Gly Thr Ser Met Phe Pro Ser Cys Cys Cys Thr Lys Pro Thr Asp       |     |     |     |
|    | 130   | 135 | 140 |     |
| 20 | Gly Asn Cys Thr Cys Ile Pro Ile Pro Ser Ser Trp Ala Phe Ala Lys       |     |     |     |
|    | 145   | 150 | 155 | 160 |
| 25 | Tyr Leu Trp Glu Trp Ala Ser Val Arg Phe Ser Trp Leu Ser Leu Leu       |     |     |     |
|    | 165   | 170 | 175 |     |
| 30 | Val Pro Phe Val Gln Trp Phe Val Gly Leu Ser Pro Thr Val Trp Leu       |     |     |     |
|    | 180   | 185 | 190 |     |
| 35 | Ser Val Ile Trp Met Met Trp Tyr Trp Gly Pro Ser Leu Tyr Asn Ile       |     |     |     |
|    | 195   | 200 | 205 |     |
| 40 | Leu Ser Pro Phe Met Pro Leu Leu Pro Ile Phe Phe Cys Leu Trp Val       |     |     |     |
|    | 210   | 215 | 220 |     |
| 45 | Tyr Ile   |     |     |     |
|    | 225   |     |     |     |
| 50 | <210> 37<br><211> 900<br><212> DNA<br><213> hepatitis B virus         |     |     |     |
|    | cctgctggtg gctccagttc aggaacagta aaccctgttc cgactactgc ctctccctta     | 60  |     |     |
|    | tctgtcaatct tctcgaggat tggggaccct gcgcgtgaaca tggagaacat cacatcagga   | 120 |     |     |
|    | ttcccttaggac cccttctcgt gttacaggcg gggtttttct tggcacaag aatccctcaca   | 180 |     |     |
|    | ataccgcaga gtctagactc gtgggtggact tctctcaatt ttgcagggggg aactaccgtg   | 240 |     |     |
| 55 | tgtcttggcc aaaattcgca gtcccccaacc tccaaatcact caccaacacctc ctgtcctcca | 300 |     |     |
|    | acttgcctg gttatcgctg gatgtgtctg cggcgttta tcattttcctt cttcatcctg      | 360 |     |     |

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|    |  |     |
|----|--|-----|
|    | ctgctatgcc tcatcttctt gttggttctt ctggactatc raggtatgtt gcccgttgt     | 420 |
| 5  | cctctaattc caggatcctc awccaccagc acgggaccat gccgaacctg catgactact    | 480 |
|    | gctcaaggaa cctctatgta tccctcctgt tgctgtacca aacctacgga cgaaaattgc    | 540 |
|    | acctgtattc ccattccatc atcctggct ttcgaaaaat tcctatggga gtgggcctca     | 600 |
| 10 | gcccgttgttctt cctggctcag ttacttagtg ccatttgttc agtggttcgt agggcattcc | 660 |
|    | cccaactgttt ggctttcagt tatatggatg atgtggtatt gggggccaag tctgtaymgc   | 720 |
| 15 | atctttagtc ccttttacc gctgttacca attttcttt gtctttgggt atacatttaa      | 780 |
|    | accctaacaa aacaaagaga tggggttact ctctgaattt tatgggttat gtcattggaa    | 840 |
|    | gttatgggtc cttgccacaa gaacacatca tacaaaaaat caaagaatgt tttagaaaac    | 900 |
| 20 | <210> 38   |     |
|    | <211> 299  |     |
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| 40 | <222> (239)..(239)   |     |
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| 45 | Cys Trp Trp Leu Gln Phe Arg Asn Ser Lys Pro Cys Ser Asp Tyr Cys      |     |
|    | 1 5 10 15  |     |
| 50 | Leu Ser Leu Ile Val Asn Leu Leu Glu Asp Trp Gly Pro Cys Ala Glu      |     |
|    | 20 25 30   |     |
| 55 | His Gly Glu His His Ile Arg Ile Pro Arg Thr Pro Ser Arg Val Thr      |     |
|    | 35 40 45   |     |

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Gly Gly Val Phe Leu Val Asp Lys Asn Pro His Asn Thr Ala Glu Ser  
50 55 60

5 Arg Leu Val Val Asp Phe Ser Gln Phe Ser Arg Gly Asn Tyr Arg Val  
65 70 75 80

10 Ser Trp Pro Lys Phe Ala Val Pro Asn Leu Gln Ser Leu Thr Asn Leu  
85 90 95

15 Leu Ser Ser Asn Leu Ser Trp Leu Ser Leu Asp Val Ser Ala Ala Phe  
100 105 110

Tyr His Xaa Pro Leu His Pro Ala Ala Met Pro His Leu Leu Val Gly  
115 120 125

20 Ser Ser Gly Leu Ser Arg Tyr Val Ala Arg Leu Ser Ser Asn Ser Arg  
130 135 140

25 Ile Leu Xaa His Gln His Gly Thr Met Pro Asn Leu His Asp Tyr Cys  
145 150 155 160

30 Ser Arg Asn Leu Tyr Val Ser Leu Leu Leu Leu Tyr Gln Thr Tyr Gly  
165 170 175

35 Arg Lys Leu His Leu Tyr Ser His Pro Ile Ile Leu Gly Phe Arg Lys  
180 185 190

40 Ile Pro Met Gly Val Gly Leu Ser Pro Phe Leu Leu Ala Gln Phe Thr  
195 200 205

45 Ser Ala Ile Cys Ser Val Val Arg Arg Ala Phe Pro His Cys Leu Ala  
210 215 220

50 Phe Ser Tyr Met Asp Asp Val Val Leu Gly Ala Lys Ser Val Xaa His  
225 230 235 240

55 Leu Glu Ser Leu Phe Thr Ala Val Thr Asn Phe Leu Leu Ser Leu Gly  
245 250 255

Ile His Leu Asn Pro Asn Lys Thr Lys Arg Trp Gly Tyr Ser Leu Asn  
260 265 270

Phe Met Gly Tyr Val Ile Gly Ser Tyr Gly Ser Leu Pro Gln Glu His

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275

280

285

5 Ile Ile Gln Lys Ile Lys Glu Cys Phe Arg Lys  
290 295

10 <210> 39  
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<213> hepatitis B virus

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20 25 30

40 Asn Met Glu Asn Ile Thr Ser Gly Phe Leu Gly Pro Leu Leu Val Leu  
35 40 45

45 Gln Ala Gly Phe Phe Leu Leu Thr Arg Ile Leu Thr Ile Pro Gln Ser  
50 55 60

50 Leu Asp Ser Trp Trp Thr Ser Leu Asn Phe Arg Gly Gly Thr Thr Val  
65 70 75 80

55 Cys Leu Gly Gln Asn Ser Gln Ser Pro Thr Ser Asn His Ser Pro Thr  
85 90 95

Ser Cys Pro Pro Thr Cys Pro Gly Tyr Arg Trp Met Cys Leu Arg Arg

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|    |  |     |
|----|--|-----|
|    | caattttcta ggggaaacta ccgtgtgtct tggccaaaat tcgcagtccc caacctccaa  | 300 |
|    | tcactcacca acctcctgtc ctccaacttg tcctggttat cgctggatgt gtctgcggcg  | 360 |
| 5  | ttttatcatc ttcctcttca tcctgctgtc atgcctcatc ttcttgttgg ttcttctgga  | 420 |
|    | ctatcraggt atgttgcccg tttgtcctct aattccagga tcctcaacca ccagcacggg  | 480 |
| 10 | accatgccga acctgcatga ctactgctca aggaacctct atgtatccct cctgttgctg  | 540 |
|    | taccaaacct acggacggaa attgcacctg tattccatc ccatcatcct gggcttcgg    | 600 |
|    | aaaattccta tgggagtgccc cctcagccccg tttctcctgg ctcagtttac tagtgcatt | 660 |
| 15 | tgttcagtgg ttcgtagggc tttcccccac tgtttggtt tcagttatat ggatgatgtg   | 720 |
|    | gtattggggg ccaagtctgy acagcatctt gagtccctt ttaccgcggg gaccaatttt   | 780 |
| 20 | cttttgtctt tgggtataaca tttaaacccct aacaaaacaa agagatgggg ttactcttg | 840 |
|    | aattttatgg gttatgtcat tggaaagttat gggtccttgc cacaagaaca catcatacaa | 900 |
|    | aaaatcaaag aa  | 912 |
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|    | <211> 304  |     |
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|    | <223> Xaa is any amino acid  |     |
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|    | 1 5 10 15  |     |
|    | Asn Ser Lys Pro Cys Ser Asp Tyr Cys Leu Ser Leu Ile Val Asn Leu    |     |
|    | 20 25 30   |     |
| 45 | Leu Glu Asp Trp Gly Pro Cys Ala Glu His Gly Glu His His Ile Arg    |     |
|    | 35 40 45   |     |
| 50 | Ile Pro Arg Thr Pro Ser Arg Val Thr Gly Gly Val Phe Leu Val Asp    |     |
|    | 50 55 60   |     |
| 55 | Lys Asn Pro His Asn Thr Ala Glu Ser Arg Leu Val Val Asp Phe Ser    |     |
|    | 65 70 75 80  |     |

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Gln Phe Ser Arg Gly Asn Tyr Arg Val Ser Trp Pro Lys Phe Ala Val  
85 90 95

5 Pro Asn Leu Gln Ser Leu Thr Asn Leu Leu Ser Ser Asn Leu Ser Trp  
100 105 110

10 Leu Ser Leu Asp Val Ser Ala Ala Phe Tyr His Leu Pro Leu His Pro  
115 120 125

15 Ala Ala Met Pro His Leu Leu Val Gly Ser Ser Gly Leu Ser Arg Tyr  
130 135 140

20 Val Ala Arg Leu Ser Ser Asn Ser Arg Ile Leu Asn His Gln His Gly  
145 150 155 160

25 Thr Met Pro Asn Leu His Asp Tyr Cys Ser Arg Asn Leu Tyr Val Ser  
165 170 175

30 Leu Leu Leu Leu Tyr Gln Thr Tyr Gly Arg Lys Leu His Leu Tyr Ser  
180 185 190

35 His Pro Ile Ile Leu Gly Phe Arg Lys Ile Pro Met Gly Val Gly Leu  
195 200 205

40 Ser Pro Phe Leu Leu Ala Gln Phe Thr Ser Ala Ile Cys Ser Val Val  
210 215 220

Arg Arg Ala Phe Pro His Cys Leu Ala Phe Ser Tyr Met Asp Asp Val  
225 230 235 240

45 Val Leu Gly Ala Lys Ser Xaa Gln His Leu Glu Ser Leu Phe Thr Ala  
245 250 255

50 Val Thr Asn Phe Leu Leu Ser Leu Gly Ile His Leu Asn Pro Asn Lys  
260 265 270

55 Thr Lys Arg Trp Gly Tyr Ser Leu Asn Phe Met Gly Tyr Val Ile Gly  
275 280 285

Ser Tyr Gly Ser Leu Pro Gln Glu His Ile Ile Gln Lys Ile Lys Glu  
290 295 300

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<210> 42  
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5 <213> hepatitis B virus  
  
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20 25 30  
  
30 Ser Arg Ile Gly Asp Pro Ala Arg Asn Met Glu Asn Ile Thr Ser Gly  
35 40 45  
Phe Leu Gly Pro Leu Leu Val Leu Gln Ala Gly Phe Phe Leu Leu Thr  
50 55 60  
35 Arg Ile Leu Thr Ile Pro Gln Ser Leu Asp Ser Trp Trp Thr Ser Leu  
65 70 75 80  
  
40 Asn Phe Leu Gly Gly Thr Thr Val Cys Leu Gly Gln Asn Ser Gln Ser  
85 90 95  
  
45 Pro Thr Ser Asn His Ser Pro Thr Ser Cys Pro Pro Thr Cys Pro Gly  
100 . 105 110  
  
50 Tyr Arg Trp Met Cys Leu Arg Arg Phe Ile Ile Phe Leu Phe Ile Leu  
115 120 125  
Leu Leu Cys Leu Ile Phe Leu Leu Val Leu Leu Asp Tyr Xaa Gly Met  
130 135 140  
55 Leu Pro Val Cys Pro Leu Ile Pro Gly Ser Ser Thr Thr Ser Thr Gly  
145 150 155 160

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Pro Cys Arg Thr Cys Met Thr Thr Ala Gln Gly Thr Ser Met Tyr Pro  
165 170 175  
5

Ser Cys Cys Cys Thr Lys Pro Thr Asp Gly Asn Cys Thr Cys Ile Pro  
180 185 190  
10 Ile Pro Ser Ser Trp Ala Phe Gly Lys Phe Leu Trp Glu Trp Ala Ser  
195 200 205

15 Ala Arg Phe Ser Trp Leu Ser Leu Leu Val Pro Phe Val Gln Trp Phe  
210 215 220

20 Val Gly Leu Ser Pro Thr Val Trp Leu Ser Val Ile Trp Met Met Trp  
225 230 235 240

Tyr Trp Gly Pro Ser Leu Xaa Ser Ile Leu Ser Pro Phe Leu Pro Arg  
245 250 255  
25

Pro Ile Phe Phe Cys Leu Trp Val Tyr Ile  
260 265  
30